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# ROYAL ONTARIO MUSEUM OF ZOOLOGY AND PALAEONTOLOGY

## Report of the Director

## 1954

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ROYAL ONTARIO MUSEUM OF ZOOLOGY & PALAEONTOLOGY

ROYAL ONTARIO MUSEUM OF ZOOLOGY & PALAEONTOLOGY

# Report of the Director

## For the year ended June 1954

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## STAFF

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F. A. Urquhart, M.A., PH.D., *Director*
M. A. Fritz, PH.D., F.R.S.C., *Associate Director*
L. L. Snyder, *Associate Director*
M. Easto, *Secretary*
E. N. Hammell, *Librarian (Palaeontology)*
E. R. McClure, *Librarian (Zoology)*
R. R. Hornell, *Chief Technician (Palaeontology)*
E. H. Taylor, *Chief Technician (Zoology)*[*]
G. Pyzer, *Attendant and Storekeeper*

### DIVISION OF VERTEBRATE PALAEONTOLOGY

L. Sternberg, *Associate Curator*
G. Edmund, M.A., *Assistant Curator*

### DIVISION OF MAMMALOGY

R. L. Peterson, PH.D., *Curator*
S. C. Downing, *Research Assistant*

### DIVISION OF ORNITHOLOGY

L. L. Snyder, *Curator*
J. L. Baillie, *Research Assistant*

### DIVISION OF ICHTHYOLOGY AND HERPETOLOGY

W. B. Scott, PH.D., *Curator*
E. B. S. Logier, *Associate Curator*

### DIVISION OF INVERTEBRATE PALAEONTOLOGY

M. A. Fritz, PH.D., F.R.S.C., *Curator*
J. Monteith, *Research Assistant*

[*] Replacing C. E. Hope and L. Walden.

## DIVISION OF ENTOMOLOGY

F. A. Urquhart, M.A., PH.D., *Curator*
G. B. Wiggins, M.A., *Assistant Curator*
E. M. Walker, M.B., F.R.S.C., *Honorary Curator*

## DIVISION OF ART AND EXHIBITS

T. M. Shortt, *Chief*
A. Reid, *Artist*
E. Thorn, *Artist*

# FOREWORD

The appearance, and method of presentation, of this year's annual report is in keeping with the steady progress which has been made by our Museum since its inception forty years ago. The early reports were naturally brief and copies were not made available to other institutions since such reports were submitted as informative letters only to the Board of Governors of the University or to the Museum Board of Trustees. When our Museum began to publish scientific papers and the research collections became important in the fields of taxonomy and distribution, it became necessary to inform our colleagues in other institutions of the work which we were doing, and therefore mimeographed copies were distributed. Prior to the report of 1947–1948, divisional activities were not reported as such. From 1947 to 1948, however, with the complete organization of our Museum staff into scientific and display divisions, divisional reports written by the Curators or Chief were presented. In order to facilitate filing and to keep our reports as library records, mimeographed copies were later covered with heavy stock paper with a marginal linen binding. Later, our reports appeared in proportionately spaced type, lithographed—a decided improvement over the mimeographed reports in ordinary type. This form of presentation was maintained up to and including the report for last year.

We have now decided to present our annual reports as a regular Museum publication. As in the present report, the same format size as our Contribution series will be maintained. This will simplify filing in small filing boxes and, at the same time, permit filing with the Contributions, if such is considered desirable.

In addition to presenting the usual statistical data, it is our sincere hope that we will be able to include one or more feature articles that have a definite bearing on the work of a particular division or divisions, or are of importance to our Museum as a whole. In our present report the feature article, written by Mr. J. L. Baillie, Research Assistant in the Division of Ornithology, deals with the late Mr. C. E. Hope, who, as our colleagues are well aware, was an outstanding technician. I wish to take this opportunity to congratulate Mr. Baillie on his fine presentation of this feature article.

We also hope to share with our colleagues in other Universities and Museums, through the medium of our annual reports, any discoveries we may make in the technical fields of display and preparation and, since our Curators have complete freedom of expression in their Divisional reports, we will be able to inform our colleagues of the nature of our research problems and of our progress in specific investigations.

F. A. URQUHART

# SUMMARY REMARKS BY THE DIRECTOR

I am indeed happy to report that Mr. Gordon Edmund, having completed the course requirements for the degree of Doctor of Philosophy at Harvard University, has been appointed by the Museum Board of Directors to the position of Assistant Curator in the Division of Vertebrate Palaeontology. I know that the Museum Board of Directors would wish to join me in extending to Mr. Edmund our sincere congratulations on his accomplishments at Harvard University and to wish him every success in his position on our Museum staff.

Through the generosity of the Carling Conservation Club and Mr. R. A. Laidlaw (a member of our Museum Board of Directors) a Museum expedition was sent to the Red Deer River region of Alberta to investigate recent exposures of dinosaurs. Mr. Levi Sternberg deserves considerable praise for the work which he did in preparing for this expedition and for the diligent manner in which he carried out the work of his division during the year.

Dr. R. L. Peterson, Curator of the Division of Mammalogy, with the assistance of Mr. S. C. Downing (Research Assistant) has done a great deal to establish our research collection of mammals as one of the important collections of its kind in Canada. Dr. Peterson led a most successful expedition to eastern Ontario and Quebec, resulting in the acquisition of a fine collection of *Phenacomys,* together with other outstanding distributional records which will be reported upon from time to time in various scientific publications in the future. Dr. Peterson, in addition to attending to the many matters pertaining to his division, and publishing a number of excellent scientific papers, completed his manuscript on the Moose of North America. This fine piece of research work will be published during the ensuing year. I wish to take this opportunity to congratulate Dr. Peterson on his noteworthy accomplishments.

The research collection of birds of our Museum is known throughout the ornithological world. This outstanding collection, meticulously arranged and minutely documented, is the result of many years of careful selection and study by the Curator of the Division, Mr. L. L. Snyder, with the assistance of Mr. J. L. Baillie (Research Assistant) and the late Mr. C. E. Hope. During the past year the Division of Ornithology continued to enlarge its collection and published noteworthy scientific papers dealing with the birds of Ontario. Mr. Snyder, in addition to attending to the many details of his Division, continued his studies of Arctic birds and we are looking forward to publishing this work in book form during the next year. Mr. Baillie, whose knowledge of the bird collection and literature on ornithology makes his services so valuable to the scientific research of the division, was named to the American Ornithologists' Union's Committee on Student Awards. I wish to take this opportunity to thank Mr. Baillie for the assistance which he has given to me on many occasions, particularly with respect to publicity releases for various Museum functions, which assistance was quite beyond his line of duty as Research Assistant in the Division of Ornithology.

The staff of our Museum and the members of our Museum Board of Directors would, I am certain, like to join me in congratulating Dr. W. B. Scott on his noteworthy publication *The Freshwater Fishes of Eastern Canada*. This publication, which is the first of its kind to appear in book form, will stand for many years as a reference book on the distribution of fishes in Eastern Canada. In addition to completing the aforementioned publication, Dr. Scott, with the assistance of Mr. E. H. Taylor (now Chief Technician in Zoology), established the research collection of fishes on new steel storage shelves. Details of this effort will be found under the Division's report.

Mr. E. B. S. Logier, Associate Curator of the Division of Ichthyology and Herpetology, in addition to completing the illustrations for a forthcoming book on the families of aquatic insects, also partially completed a check-list of the amphibians and reptiles of Canada which will appear in book form during the coming year. We are indeed fortunate to have on our staff one who has been endowed with so many outstanding talents as has Mr. Logier. In addition to his fine scientific research, the results of which have appeared in many scientific papers and in a recent book on the amphibians of eastern Canada, published by Clarke, Irwin and Co., Ltd., Mr. Logier has been solely responsible for the excellent research collection of amphibians and reptiles now in our Museum, and he has executed numerous illustrations of outstanding quality that have appeared in his own published works and in a book on insects entitled *Introducing the Insect*. It is indeed rare to find in one person the attributes of an outstanding scientist and accomplished artist.

Dr. M. A. Fritz, in addition to fulfilling her lecture duties as Professor of Invertebrate Palaeontology in the Department of Geological Sciences of the University, continued her studies of the James Bay Lowland Area resulting in a detailed knowledge of the stratigraphy and palaeontology of the Devonian of this particular area. It is significant that as a result of this work evidence has been afforded for the conclusion that a barrier reef in Middle Devonian time was present in what is now the James Bay Lowlands. In addition to fulfilling the many routine duties of the division and the lecture responsibilities to the University, Dr. Fritz has carried out a number of research projects which are outlined in her divisional report. In this connection, I would like to make special mention of the excellent work which Mr. John Monteith (Research Assistant) accomplished during the year, not only with regard to the assistance afforded to Dr. Fritz, but also in attending to the numerous routine demands of the division.

I realize that the staff of our Museum would wish to join me in congratulating Dr. E. M. Walker, Honorary Curator of the Division of Entomology, for his noteworthy scientific achievement in completing Volume 1 of *The Odonata of Canada and Alaska,* which was recently published by the University of Toronto Press. Dr. Walker, who in the early days of our Museum's history was Assistant Director, has continued his interest in the study of the Odonata after retirement as Head of the Department of Zoology of the University of Toronto. We are both proud and happy to have Dr. Walker associated with us and we are looking forward to the publication of Volume 2 of his *Odonata of Canada and Alaska* which will deal with the Anisoptera.

Mr. G. B. Wiggins has been in charge of the Division of Entomology during the past year. In this capacity he has shown excellent judgment and meticulous attention to the details of divisional organization.

The importance of gallery displays must be kept in mind in any institution whose responsibilities are divided between public educational service and scientific research. Mr. T. M. Shortt and his staff, Mr. A. Reid and Mr. E. Thorn, are to be congratulated on the fine gallery displays which they have prepared during the past year. The interest of the members of this division in display and their knowledge of general zoological topics are apparent when the more recent gallery exhibits are studied. The past four years have been most strenuous ones for this division owing to the establishment in our galleries of a large permanent exhibit on Canadian fishes, a project carried out in cooperation with the Federal Department of Fisheries. The pleasing combination of scientific accuracy, colour rendition and balanced arrangements, will, I am certain, appeal to the general public, the students of primary and secondary schools, and the students of the University, for many years to come.

Although research in the field of systematics is based upon a careful study of the animal specimen, it would be quite impossible to arrive at any general conclusions without the assistance of the published records of past investigations. In this connection I would like to mention the fine work carried out by Miss McClure for the Library on Zoology in handling many hundreds of publications and meticulously recording on card files the pertinent information as references to assist the research divisions. I would also mention the competent manner in which Miss Hammell has attended to the routine duties in the Library for Palaeontology.

There are many apparently non-scientific tasks that must be attended to in order that the final results of an investigation may be published. Mr. George Pyzer, Attendant and Storekeeper, deserves special mention for his many contributions towards the final results which have appeared in our published scientific papers and reports. Mr. Pyzer's strict application to the work at hand and his amiable cooperation with all members of the staff are outstanding qualities worthy of the highest praise.

The Technicians, Mr. R. R. Hornell and Mr. E. H. Taylor, have made it possible for the scientific staff to study and examine minute anatomical details with the least amount of effort. A well-prepared specimen is most important for the research of the scientist of the present and those of future generations. During the past year Mr. Hornell undertook to prepare thin sections for the Division of Invertebrate Palaeontology, in addition to his regular technical duties of preparing specimens for the Division of Vertebrate Palaeontology. Mr. Hornell investigated various methods of making thin sections and interviewed technicians in other departments of the University and technicians at the Dental College. This experience will prove invaluable to Mr. Hornell in the future and will be of considerable value to our Museum.

Mr. E. H. Taylor, formerly Technician in the Division of Ichthyology and Herpetology, took over the duties previously carried out by Mr. C. E. Hope and Mr. L. Walden. Within a very short time, Mr. Taylor was producing study skins of excellent quality and he is to be congratulated on his very fine efforts.

The central hub of any research institution is the Secretary's office. We of the staff of the Museum of Zoology and Palaeontology realize how fortunate we are to have such an efficient secretary as Miss Mildred Easto. Her duties are many and varied. As private secretary to the Director her services are indispensible, and much that has been accomplished during the past year is indirectly the result of Miss Easto's outstanding abilities.

I know that the members of the Museum Board of Directors would wish to join me in extending a very sincere "thank you" to all the members of our staff for a year of earnest endeavour. The accomplishments of the various divisions, here set forth, merit careful consideration.

# CLIFFORD ERNEST HOPE (1910-1953)

### By JAMES L. BAILLIE

Mr. C. E. Hope, whose death at Toronto on August 9, 1953, came as a great shock to his family, associates and friends, was one who loved the outdoors from early childhood. He was an assiduous collector. At the age of fourteen, when he began to form an insect collection, he could be found daily, after school, prowling over the then semi-rural fields and roadsides.

It is worth recalling that from the start Cliff prepared and labelled his specimens with meticulous care, a habit which he never lost. And there is no doubt that it was a combination of his intense interest in collecting, his love of wild creatures, and his care in writing his notes and preparing his specimens that later steered him into his life's work in our Museum.

Although he showed professional ability at his hobby, years before there was any real opportunity of employment in his chosen field, he became an apprentice bricklayer, in his teens, in order to earn a living.

Several persons, perhaps unwittingly, assisted Cliff once his early collecting endeavours had reached notable proportions. Since his first love was insects, he sought out others whose inclinations tended in this direction. One of his first companions was Lorus Milne, then a budding entomologist of high school age who since has become well known as co-author (with his wife) of *A Multitude of Living Things.*

The late Charles E. Corfe was another entomologist whose path Cliff crossed frequently in the woods and fields before either had any thought of joining the Museum staff. Although there was a very great disparity in their ages, the two became fast friends. Others who influenced Cliff in his early days were Norman Bigelow, until 1926 entomologist at the Museum, who helped Cliff immensely in those days, particularly with problems of identification, Lou Owens, and Stuart Thompson.

At the age of sixteen, Cliff switched his interest from insects to birds' eggs. I well recall first meeting Cliff Hope one day in November, 1926. At this time he could be found early in the morning, or in the evening, strolling through Cedarvale or Black Creek ravines with a haversack over his shoulder (containing his lunch) and a candy-box under his arm (containing whatever birds' eggs or insects he had been able to secure during the course of his ramble). In 1927 he began to collect birds and prepare them into study-skins.

CLIFFORD ERNEST HOPE, 1910–1953

I visited him late that year at his parents' home and he proudly showed me his first hundred skins, expertly prepared, and, he assured me, taken entirely with a catapult, as his parents would not allow him to use a shotgun.

It was only natural that he should soon branch out into mammalogy. In 1928 he trapped his first small mammals and before long most of the smaller species to be found in the local ravines were represented in his collection.

In 1929 he published, in the *Canadian Field-Naturalist,* the first of thirty-two contributions he made to zoological literature—a paper on the nesting of the Upland Plover in the Toronto region. This was followed by another in the same volume recording the first capture of the little Pigmy Shrew in Toronto. A third, published in 1930, places on record the winter occurrence of the White-throated Sparrow at Toronto. Articles on Hoary Bat, Greater Redpoll, Pygmy Shrew (further captures), Carolina Wren, Bog Lemming-mouse and Woodland Jumping Mouse followed in 1931, 1932 and 1933. The last two were first records for Toronto, the former from a little 12 x 12 woodland cabin he built in 1932 for week-end use in a cedar swamp at Credit Forks, the latter from Glen Major.

Following a short employment as a keeper at Riverdale Zoo in 1931, Cliff forsook the building trades in 1932 and joined the staff of the Royal Ontario Museum as preparator of birds, a few months prior to the opening of the east wing. He never regretted the change, and remained with the Museum, becoming Senior Technician, until his untimely death last August at the age of forty-three.

He gained an outstanding reputation throughout Canada and the eastern United States as a collector and preparator of zoological study specimens. The Bird Room in the Museum contains many thousands of examples of his work, painstakingly prepared and meticulously labelled.

In 1933, Cliff participated in his first field-work for the Museum, accompanied by Mr. L. L. Snyder, Curator of the Division of Ornithology, and Mr. T. M. Shortt, to Credit Forks, where material was gathered preparatory to constructing a Passenger Pigeon habitat group for the public gallery.

In 1928 he was elected a member of the Brodie Club and he was one of the first members elected to the newly-organized Toronto Ornithological Club in 1934. In those groups he was an active member in fact as well as name, contributing frequent papers to the programs, acting on committees and serving as chairman of meetings when it came his turn.

In 1934 he read a paper before the annual meeting of the American Association of Museums held at Toronto on the use of Resoline NF for relaxing dried skins. This paper was published in *Museum News* (1935).

In 1935 he set out into the field again, with Messrs. Snyder and Shortt, touring much of southern Ontario by car, gathering information on the distribution of birds and doing some incidental collecting. He published five additional notes in the *Canadian Field-Naturalist* during this year, reporting on the occurrence of a Yellow Rail at Clarkson, Starlings bathing on a cold day, a large movement of the terrestrial form of the Newt, an unusual nesting-site for the Red-winged Blackbird, and a Sparrow Hawk capturing a Horned Lark.

During the winters of 1935–36 and 1936–37 Cliff examined hundreds of disgorged pellets of Short-eared Owls in order to determine the food of that predator. The results of this study showed that the 1,330 pellets examined contained the remains of 1,570 Meadow Mice, 472 Deer Mice, 1 House Mouse, and 19 small birds, and formed the subject of a joint paper (with Mr. L. L. Snyder) published in the *Wilson Bulletin* entitled "A Predator-Prey Relationship between the Short-eared Owl and the Meadow Mouse" (1938). A further paper, by Cliff, on "Studying Owl Pellets," was published in *Canadian Nature* (1944).

My first field association with Cliff was in 1936 and 1937 when we made collections of breeding birds along the northeast shore of Lake Superior

(Rossport to Amyot) and in Sudbury District (Chapleau to Bigwood). Reports on both these surveys appeared under our joint authorship, as Museum Contributions (1943, 1947). In 1937 the *Canadian Field-Naturalist* published his note on the occurence of the Golden-winged Warbler at Toronto.

Under Mr. Snyder's supervision, Cliff initiated the Museum's collection of bird skeletons. This now totals 114 mounted and 300 articulated and disarticulated skeletons, comprising in all 247 species.

In 1938 Cliff was delegated to inaugurate a series of summer surveys in the Patricia portion of Kenora District to provide the Museum with collections and data on the breeding birds of an unknown part of the province. Cliff organized and carried out field-work at Favourable Lake (1938), Lake Attawapiskat (1939), Fort Severn (1940), Moosonee to Fort Albany (1942) and Cape Henrietta Maria (1948), all in the Hudson Bay drainage of the province.

An important paper, written by Cliff in collaboration with Mr. Shortt, placed on record in the Auk (1944) an account of the southward migration of adult shorebirds along the west coast of James Bay. Another, in the Auk (1943), recorded the first Ontario occurrence of the White-winged Dove, at Fort Albany in 1942. A Brewer's Blackbird, secured at Lake Attawapiskat in 1939, was another addition to the provincial bird-list as a result of his northern collecting trips. New breeding species established were Orange-crowned Warbler (Favourable Lake), Common Redpoll and Blackpoll Warbler (Lake Attawapiskat), Arctic Tern, Least Sandpiper, Gray-cheeked Thrush, Smith's Longspur, Tree Sparrow, Greater Scaup, Hudsonian Curlew (Fort Severn), Pectoral Sandpiper and American Pipit (Cape Henrietta Maria). The collections and notes gathered in this Patricia work are of great value to the Museum and to ornithology in general.

In 1946 Cliff published a note on the Grasshopper Sparrow in Peel County (*Canadian Field-Naturalist*) and this was followed by papers on the Redhead and Trumpeter Swan (*Carling Conservation Digest,* 1947–48), Little Blue Heron (Auk, 1949) and the first Ontario occurrence of the Black Vulture and Eared Grebe (Auk, 1949, 1950).

During the summer of 1944, Cliff cooperated with the Ontario Department of Lands and Forests to investigate the effects of DDT spraying on birds, and the relation of the spruce budworm to birds, in Algonquin Park. The results of these researches appeared in the Department's Division of Research Report (1945). In 1945, 1946 and 1947, he was again in Algonquin Park initiating the Department's studies on bird populations which are still being carried on in this Wildlife Research Area. "Bird Population Studies in Algonquin Park" (Research Report, Ontario Department of Lands and Forests, 1945), and the "Nesting of the Evening Grosbeak in Algonquin Park" (*Auk*, 1947) were published as a result of this work.

In December, 1946, he was borrowed for a week by the Department and taught the Department's overseers something about bird recognition at the Ranger School at Dorset.

In 1944, 1945 and 1946, Cliff assisted Dr. M. A. Fallis in his studies of the parasites and cycles of the Ruffed Grouse in the Palgrave area northwest of Toronto. As a result of this investigation a joint paper was published in the *Canadian Field-Naturalist* (1950) entitled "Observations on Ruffed Grouse in Southern Ontario with a Discussion of Cycles."

A short trip to Bradley's Marsh, on Lake St. Clair, in the fall of 1946, to examine ducks shot by gunners, for the Department, resulted in his paper in *Sylva* (1947) entitled "Classifying Age in Game Birds."

During the winter of 1945–46 Cliff collected 589 pellets of Snowy Owls. As a result of this examination it was shown that 98% of the food of these predators during that winter was made up of small mammals—the indigestible parts of 2,061 Meadow Mice, 229 Deer Mice, 52 House Rats, 8 Short-tailed Shrews, and 3 Cottontails being identified in the pellets examined.

In 1947 Cliff made collections of breeding birds along the line of the Canadian National Railways at Sioux Lookout and Malachi. Results of this field-work were incorporated in "Summer Birds of Western Ontario," published in the *Transactions of the Royal Canadian Institute* (Snyder, 1954).

In 1950 he made a trip to Wyoming, accompanying Mr. G. Lindblad of the Museum, on palaeontological field-work. Cliff brought back a collection of summer birds. In 1952, his last field-work, he and I made collections, by car, in the Hearst and Swastika areas.

The contributions Cliff made, by his own collecting, to the research series in the Museum collection, total 4,148 skins.

Cliff helped further the work of the Museum in a great many ways beyond his own specialized collecting and preparation endeavours. He was an experienced manager and for years acted as custodian of supplies in the laboratories. In organizing and conducting field-parties his services were invaluable. Frequently, when the Division of Ornithology required help in undertaking routine matters, Cliff proved as capable and enthusiastic as he was in his own particular position.

In the Museum are to be found his own private mammal collection (375 skins) and hundreds of specimens of insects taken incidental to his bird collecting or prior to his employment at the Museum. Some idea of the extent and importance of this leisure work may be had from the record of the insect specimens he brought back from Lake Attawapiskat (165 Odonata, 384

Orthoptera, 298 Lepidoptera) and Fort Severn (488 Odonata, 101 Orthoptera, 149 Lepidoptera).

At the time of his death he was engaged in writing a book dealing with collecting and preparation techniques.

Cliff's passing is a great loss to the institution. His good humour, likable manner and intense and careful application to his work, both in the laboratory and in the field, were among his qualities that will be most missed by his Museum associates. Canadian ornithology is the poorer for his passing.

Born in Toronto, March 31, 1910, he married Catharine Holden June 2, 1934. His widow, and his daughter, Ann, survive.

## VERTEBRATE PALAEONTOLOGY

### By LEVI STERNBERG

In order to enlarge our present collection of Canadian dinosaur material and to obtain further specimens for research purposes, an expedition was organized to visit the fossil beds in the Red Deer River region of Alberta during the period of June 1st to September 15th. The personnel of this expedition is the Associate Curator, Assistant Curator and Chief Technician.

Due to the kindness and generosity of the Museum of Comparative Zoology, Harvard University, it has been possible for Mr. G. Edmund, the Assistant Curator, to obtain a mountable skeleton of a rare fin-backed reptile from the Permian formation of Texas, five lung fish burrows, casts of footprints of eight amphibians, a cast of an Eocene bird from Wyoming, and a cast of a small crocodile from Europe.

Seven specimens of amphibians and eight fossil fish from Linton, Ohio, collected by Mr. Donald Baird of Harvard University, were received by exchange. A large mammoth tooth collected in the Yukon was donated by Mr. J. S. Cranswick.

In exchange for material from Rancho La Brea, California, a specimen of the duckbilled dinosaur was sent to the Los Angeles County Museum. An excellent specimen of an armoured dinosaur was prepared during the year to be used for exhibition purposes. Two dinosaur skull casts were sent to the University of Nebraska, and one to Harvard University.

During the past few years a considerable amount of time has been spent in an attempt to enlarge our present divisional library. By means of gifts, exchanges and purchases, approximately six hundred publications, dealing with Vertebrate Palaeontology, were added to our library holdings. This number includes one hundred and twenty-two publications donated by Mr. C. A. Sternberg, of Ottawa, Ontario.

In conjunction with efforts directed at improving our library facilities, index cards for 550 publications were added to our reference catalogue.

The Division was indeed pleased to have the honour of entertaining the members of the Society of Vertebrate Palaeontology during the past year. The members enjoyed their visit and learned a great deal about the work we are doing and our plans for the future.

We were pleased to have as visitors during the past year Hildegarde Howard, Chief Curator, and Henry A. Wylde, Curator of Arts and Exhibits, of the Los Angeles County Museum.

## DIVISION OF MAMMALOGY

### By R. L. PETERSON

The past year has been a singularly important one in the history of this division. The total of 2,863 specimens received exceeds by more than 1,000 the greatest number of specimens ever received in any one year in the past. This total is more than four times the average received in the past six years.

A highly successful field party, assisted by the Research Council of Ontario, under the leadership of the Curator, worked in several regions of eastern Ontario and western Quebec to produce 1,004 specimens during a six-week period. Among the most outstanding specimens collected was a series of 88 *Phenacomys*. Mr. R. M. Bateman secured an additional 18 *Phenacomys* from south of Leaf Bay, west of Fort Chimo. Thus in the history of mammal collecting in Ontario and Quebec a total of only 175 specimens is known to have been taken, of which 123 are now in the collections of this Division (106 being obtained this past summer).

The facilities of the division were greatly expanded and improved through some major reorganization, particularly in the rotunda laboratory and the acquisition of additional space on the fifth floor. The larger glass cases containing mounted osteological specimens were dismantled and removed from the rotunda and most of the mounted skeletons were reduced to disarticulated specimens. This allowed a reorganization of the wooden cabinets with several being placed in the new space in the fifth floor to house the first part of the osteological collection. We were particularly fortunate in being able to utilize several large banks of wooden cabinets which were being replaced by the division of Ichthyology and Herpetology. These have proved ideal for storage of osteological material and have been situated along one side of the rotunda and lining each side of the elevator alcoves. Thus for the first time the division now has adequate storage space for most of the osteological specimens on hand. This reorganization has also allowed the removal of large antler skulls from the basement corridor and the consolidation of our entire collections.

Of the total specimens received, 1,017 were obtained by staff collecting, 610 by purchase, 1 by exchange, and 1,235 by donation. Among these donations several seem worthy of special mention: Mr. Eli Davis donated a collection of 631 mammals which contained forms new to our collection and many valuable distributional records. Mr. R. M. Bateman provided 100 specimens, chiefly from the Ungava region of Quebec. Particularly important are the 18 *Phenacomys* which are virtual topotypes of *Phenacomys ungava*. Mr. A. T. Cringan donated 86 specimens, chiefly from the little known Patricia portion of Kenora District, Ontario. Mr. D. A. Smith provided 73 laboratory reared *Dicrostonyx* which contained many specimens of known age. Mr. A. W. Ghent donated 59 specimens from various areas in Ontario. Mr. J. B. Foster provided a collection of 56 specimens from southwestern United States and the western States and Provinces. A total of 167 specimens was received through the facilities of the Ontario Department of Lands and Forests. These were carefully selected and desirable specimens, including valuable furbearers. Mr. E. H. McEwen donated 12 specimens from the Mackenzie Delta region of the Northwest Territories.

Through the kindness of Dr. Robert Rausch, of the Arctic Health Research Centre in Alaska, a skull of the sea otter was made available, the first in our collection.

Specimens prepared in the laboratory included 94 study skins, 15 tanned hides, 1,143 skulls and 3 skeletons. The division suffered the loss of the services of Mr. L. A. Walden through resignation. Most of the preparation work during the year has been carried out through the part-time employment of University students.

Students were also utilized for assistance in registration. Although only 574 specimens were actually incorporated into the collection, the clerical work was completed on 2,261 to give a processed total of 2,835.

Through the financial assistance of the Research Council of Ontario, Mrs. Joan Holling was employed for the year to work on the bibliographic index. She was able to complete most of the backlog to bring it virtually up-to-date. It now contains approximately 40,000 entries and continues to become more useful.

The research program of the division centred around the completion of the manuscript for a book by the Curator entitled *North American Moose*. Final arrangements have been made with the University of Toronto Press for the early publication of this work. In connection with this work, the Curator collaborated with Mr. R. C. Passmore of the Research Division and Mr. A. T. Cringan of the Fish and Wildlife Division, both of the Ontario Department of Lands and Forests, in a special study of tooth area in relation to age of moose. Over 600 lower jaws of moose were amassed for this study which is to be included as an appendix of the above mentioned book.

Other research projects of the division, mentioned in the last annual report, were carried forward. The most active of these was a study of the red foxes of Canada which had the assistance of Miss Anne Innis under a research grant from the National Research Council.

Three papers by the Curator (one joint) have been published in the Contribution series of this Museum (Nos. 36, 37 and 38).

The Curator offered the graduate course in Mammalogy for the Department of Zoology, University of Toronto, and also conducted the mammal portion of the under-graduate course (Zoology 25).

The Curator was re-elected as Recording Secretary of the American Society of Mammalogy and thus began his sixth consecutive year on the Board of Directors of that Society. He also served on the Membership Committee and attended the regular annual meeting held in New York.

## DIVISION OF ORNITHOLOGY

### By L. L. SNYDER

Considerable modification of programme within the division has been necessitated by the death of Mr. C. E. Hope, Senior Technician, on whom a commemorative article appears elsewhere in this report. The research collections will suffer both a qualitative and quantitative loss by his passing. Certain facets of the division's activities must be largely discontinued—osteological preparations, which require a special knowledge and skill born of long practise, are an example. This is especially regretable in view of the grain of truth in the accusation that ornithologists "save the skin and throw away the characters." Not only was Mr. Hope a valuable laboratory worker, but as a collector in the field his acumen with birds was often astonishing to his associates.

The division's accessions for the year total 811 specimens. Of this total 777 were prepared skins representing local collections, namely 428 from London, Ontario, presented by Mr. Eli Davis, and 291 from Bryanston, Ontario, presented by Mr. Robert Elliott. A collection of 36 prepared specimens from southern Alberta was presented by Mr. O. D. Boggs. Exchanges added 22 specimens to the collection. The division has continued to have the valuable cooperation of the Ontario Department of Lands and Forests in choosing from confiscated or casualty birds, in the flesh, specimens for preservation.

Progress was made in registering uncatalogued specimens during the year, largely by the assistance of extra help during the summer period. A total of 1,726 specimens was catalogued and distributed in the research collection. A major task of the division during the year was the removal of specimen material (skeletons, eggs, nests, mounts), some awaiting technical attention, from the ground floor corridor. To obtain the necessary cabinets the teaching collection in the class-room was reduced to bare essentials (reserve material being presented to the Ontario Agricultural College) and all available floor space in the bird range was filled.

The Curator has continued his studies of Arctic birds, a necessary part of the preparation of a field guide on this subject. He also continued his annual census and bird-banding operations during the early summer. A contribution toward the completion of the fifth edition of the *Check-List of North American Birds,* produced by the American Ornithologists' Union, has been made, largely by the Curator. Revision of the manuscript on the Families *Charadriidae* and *Scolopacidae* was accomplished which involved the incorporation of suggestions of numerous collaborators and adding pertinent information from ornithological literature published since 1947.

The Research Assistant has continued to edit and prepare the seasonal reports (Audubon Field Notes) for the Ontario—Western New York region. Also, he has added an estimated 700 entries to the division's master maps concerned with bird distribution in Ontario.

The division has given assistance to individuals and institutions carrying on research in the following ways: Data on *Leucosticte* to N. R. French, University of Utah; measurements of *Empidonax* specimens to Allen R. Phillips, Tucson, Arizona; an outline of ornithological questions re Bylot Island, J. Van Tyne, University of Michigan; data on ducks, Cornell University; Ontario range data on *Dolichonyx oryzivorus,* K. Parkes, Carnegie Museum; critical reading of MSS (3) for authors or editors; identification of a collection of birds (43) for Geo. Stirrett, Kingston, Ontario.

A large number of specimens (620) has been forwarded to specialists, at their request, for study or technical use. Those served are as follows: A. E. Allin (9), Fort William, Ont.; O. D. Boggs (13), Calgary, Alta.; Angus Shortt (4), Winnipeg, Man.; National Museum of Canada (5), Ottawa, Ont.; University of California (8), Los Angeles, Calif.; University of California (154), Berkeley, Calif.; Cornell University (8 + 303 + 12), Ithaca, N.Y.; Northwestern University (104), Evanston, Ill. Data, literature and working facilities were made available to W. E. C. Todd of Pittsburg, who visited the division for study.

The Curator gave the ornithological portion of Zoology 25 to University students. He also served his final year as a member of Council of the American Ornithologists' Union, and was appointed to its Committee on the Brewster Memorial Award. The Research Assistant was named to the Union's Committee on Student Awards.

A number of activities in the nature of public relations were incidental to the division's programme. Lectures were given to audiences other than University classes by the Curator (6), and by the Research Assistant (13), seven of the latter being radio and television appearances. One consultation with city authorities was directed at the starling problem in the City of Toronto.

## DIVISION OF ICHTHYOLOGY AND HERPETOLOGY

### By W. B. SCOTT

Changes concerning both staff and collections occurred in the division during the last year. Mr. E. H. Taylor, the division's Technician, was promoted to the position of Chief Technician in Zoology effective February 1, 1954, and has thus moved from the division and the position he held since 1947.

The entire fish collection of more than 16,000 catalogued lots was moved from the main collection room, while the wooden cupboards and shelves of the 1,900 square foot collection room were removed and replaced with approximately 2,300 linear feet of 18–inch wide steel shelving, thus affording about three times the previous storage space. The work involved in the complete removal of the collection from the main storage room, the erection of shelves and the subsequent replacement of the collection, was considerable, and will take almost a year to complete. The collection, formerly arranged according to the numbered family system of Jordan, is being rearranged on the basis of the group system which is used by the Museum of Michigan and certain other museums in the United States. In addition, approximately 300 crocks and churns, housing large fishes, were emptied, the contents appraised and recorded on an outside label. The division was fortunate to have the part-time assistance of three students: Mr. E. J. Crossman, a graduate student proceeding to an M.A. degree; Mr. D. Guyatt, a first-year student; and Mr. J. Woodford, a high school student. The services of these students were particularly valuable during the moving and re-arrangement of the collection.

Because of the work involved in increasing the collection facilities, only 300 lots of fishes were added to the permanent collection. However, many important collections were added to the division's holdings during the current year, and a total of 569 lots and individuals were accessioned. Two of the more important accessions were 196 lots representing both salt and fresh-water fishes from the Maritime Provinces, donated by Dr. A. G. Huntsman, and 200 lots from Bruce County, Ontario, donated by the Ontario Department of Planning and Development.

The collection of amphibians and reptiles, formerly housed with the fish collection, but now allotted a separate room, was not increased, and only 37 lots and individuals were accessioned. Important accessions were of five dusky salamanders from Brome County, Quebec, and two from King's County, New Brunswick, the first Canadian specimens received by this Museum.

The identification service was continued and 25 lots involving over 500 fishes were identified for provincial government departments of Ontario, Manitoba and Saskatchewan, as well as for teachers and private individuals.

The division's collection of fishes was used to further research projects of ichthyologists from other institutions. Dr. R. M. Bailey, Curator of Fishes, Museum of Zoology, University of Michigan, made use of the collection during a one-day visit, and Dr. V. D. Vladykov and Mr. R. Barossa, Department of Maritime Fisheries, Quebec, spent two days in the division. The collections have also been of service to the Research Division and Fish and Wildlife Division, Ontario Department of Lands and Forests, as well as to graduate students in our own as well as other universities. The collection has also been used by such organizations as commercial art firms, who have been commissioned to produce illustrations of fish for advertising purposes.

The division lent a total of 26 catalogued lots to research workers in other institutions. Among the receivers mention may be made of Dr. V. D. Vladykov, Department of Maritime Fisheries, Quebec, and Mr. Vianney Legendre, University of Montreal.

Curatorial activities were many and varied, but chief among them was the preparation of manuscripts for publication. Mr. Logier was occupied during most of the year in the preparation of the final manuscript and maps for the forthcoming checklist of the amphibians and reptiles of Canada and Alaska. An illustrated handbook written by the Curator entitled *The Freshwater Fishes of Eastern Canada* was completed and published. In co-authorship with Mr. G. H. Lawler, Fisheries Research Board of Canada, the Curator prepared a a paper dealing with the distribution of a group of fish parasites, the cestode genus *Triaenophorus,* in North America, which has been submitted for publication. Other curatorial activities included serving on graduate examining committees; supplying technical advice and assistance in the preparation of a film for the Carling Conservation Club dealing with the smallmouth bass; and acting as technical adviser to the Division of Art and Exhibits in the preparation of a new fish gallery. Both the Curator and the Associate Curator have served as referees for papers submitted for publication to the *Canadian Field-Naturalist* and the *Canadian Journal of Zoology.*

The Curator was elected a member of the Committee on Common and Scientific Names of Fishes of the American Fisheries Society, and was also elected a technical director of the Ontario Council of Commercial Fisheries.

# FRESHWATER FISHES
## OF EASTERN CANADA

BY W. B. SCOTT

*Photographs by W. H. Carrick*

UNIVERSITY OF TORONTO PRESS
IN CO-OPERATION WITH THE ROYAL ONTARIO
MUSEUM OF ZOOLOGY & PALAEONTOLOGY : 1954

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### THE AUTHOR

W. B. Scott, Ph.D., is Curator of the Division of Ichthyology and Herpetology, Royal Ontario Museum of Zoology and Palaeontology. His data are based on records maintained at the Museum for many years, and on his own extensive researches. This is a scientific, authoritative book.

### FOREWORD BY W. J. K. HARKNESS

An interesting discussion of fish conservation and restocking is supplied by Dr. W. J. K. Harkness, Chief, Division of Fish and Wildlife, Ontario Department of Lands and Forests.

### ILLUSTRATIONS

W. B. Carrick, internationally known Canadian photographer, has taken especially for this book 108 photographs, designed to give the most vivid and accurate representation possible in black and white. A beautiful four-colour photograph of the smallmouth black bass appears on the cover of the book.

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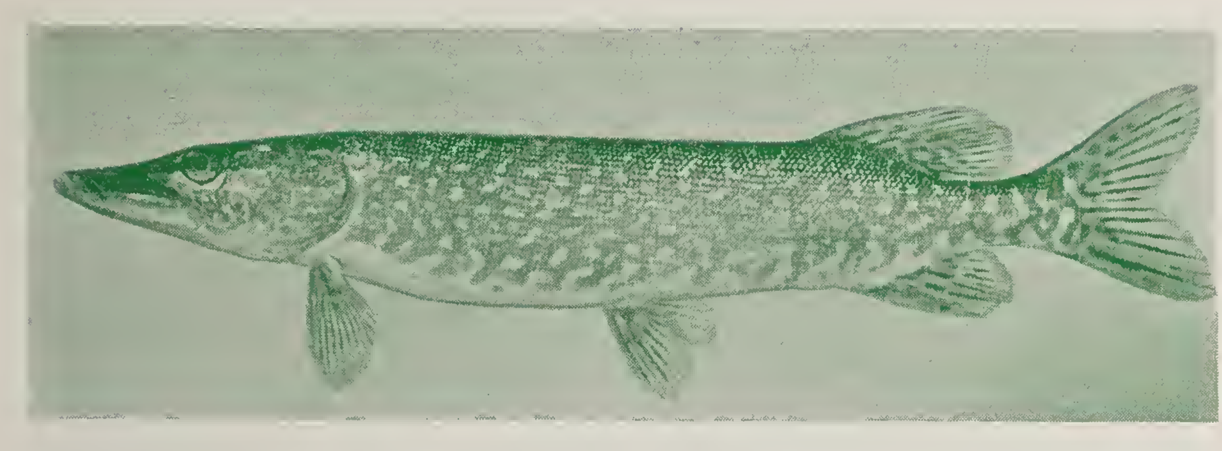


### NORTHERN PIKE

*Esox lucius*

**Other common names:** Pike, great northern pike, grass pike, jackpike, jackfish, jack, snake.

**Distinguishing features:** The body is very elongate and somewhat laterally compressed. The head is large and has a flat dorsal surface. The mouth is large, possessing many long, sharp (backward-pointing) teeth on the flattened "duck-like" jaws. In addition to those on its jaws, the northern pike has patches of teeth on the roof of its mouth. The cheek and the upper half of the gill cover are covered with small scales. On the under side of the lower jaw there are 10 sensory pores or holes. The back is green or dark green in colour, shading to lighter green on the sides and white below. On the sides are many elongate (bean-shaped), light-coloured spots; the young, up to 6 or 7 inches in length, have light vertical bars.

**Size:** The northern pike averages about 2 to 4 pounds in weight in southern Ontario, but every year fish in excess of 15 and 20 pounds, and over 3 feet long, are reported.

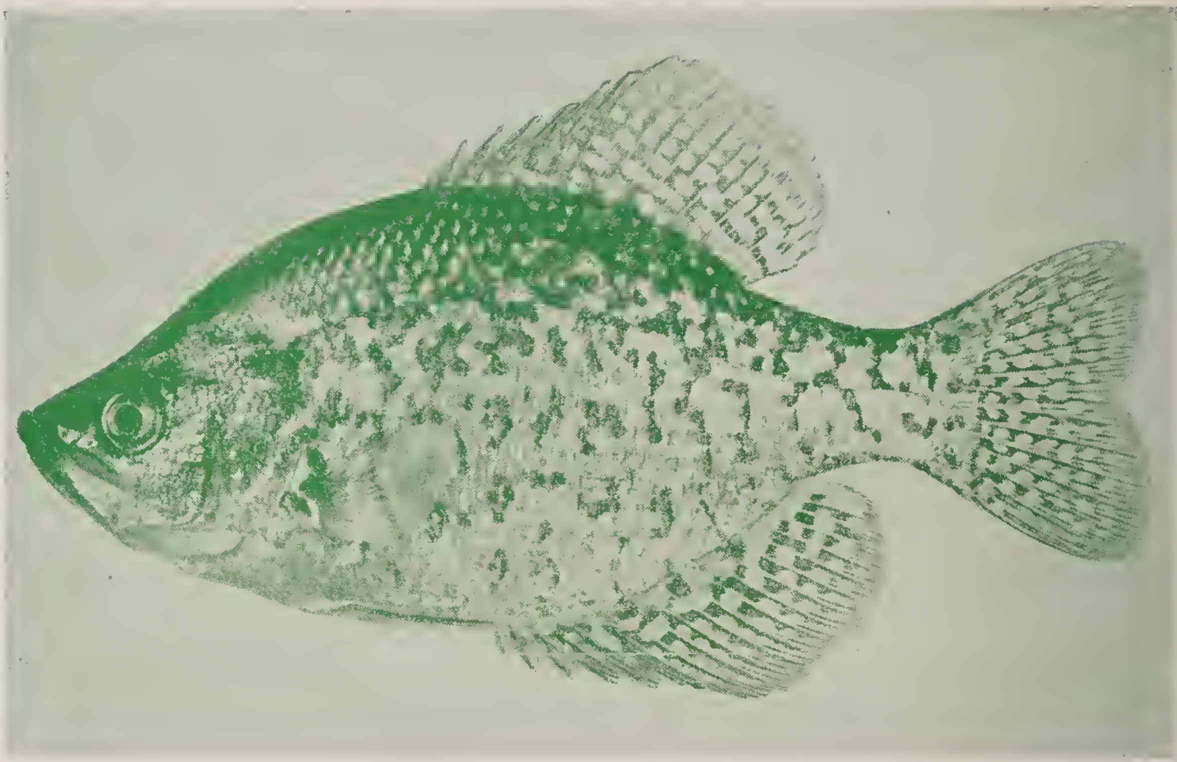
**Occurrence:** The northern pike is found in New Brunswick, Quebec, and Labrador and throughout Ontario (northwestward to Alaska). It is absent from certain highland areas in Ontario, such as those of Algonquin Park and Haliburton County. (The northern pike occurs throughout the northern hemisphere in North America, northern Europe, and northern Asia.)

**Life history and habits:** During summer the northern pike is found in the weedy shallows of lakes, frequently hanging motionless just below the surface, but when the waters commence to cool it moves into the deeper waters. Spawning takes place in the early spring, shortly after the ice goes out. Weedy shallow bays and flooded, marshy areas are selected and the eggs are scattered and then deserted by the spawning fish. Female fish live longer and grow to a larger size than male fish—prize-winning northern pike caught by anglers are usually females.

**Food:** Northern pike feed primarily on other fishes but are not too selective in their feeding habits. Aquatic insects, leeches, crayfish, frogs, snakes, mice, small muskrats, small ducks, and fish of all kinds have been devoured. The fishes most commonly eaten are suckers, yellow perch, and minnows.

**Comments:** Although alternately cursed and praised by Canadian fishermen, the northern pike is still one of our popular game fishes. In northern inland waters it is an important commercial species. The flesh is white and flaky.

SAMPLE PAGE



BLACK CRAPPIE
*Pomoxis nigromaculatus*

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Please send me copy(ies) of *Freshwater Fishes of Eastern Canada*, by W. B. Scott, at $2.50 a copy.

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## DIVISION OF INVERTEBRATE PALAEONTOLOGY

### By M. A. FRITZ

During the year 389 specimens were added to the permanent research collection: 126 by donation, 202 by staff collection, 61 by exchange.

*Summary of accessions follows*:

| | By donation | By staff collection | By purchase | By exchange | Totals |
|---|---|---|---|---|---|
| Spongiae | 1 | | | | 1 |
| Anthozoa | 10 | 52 | | | 62 |
| Stromatoporoidea | 4 | | | | 4 |
| Tubicolar worms | 50 | | | | 50 |
| Crinoidea | | 2 | | | 2 |
| Asteroidea | | 1 | | | 1 |
| Bryozoa | | 40 | | | 40 |
| Brachiopoda | 21 | 30 | | 13 | 64 |
| Pelecypoda | 6 | | | 1 | 7 |
| Gastropoda | 27 | 7 | | | 34 |
| Cephalopoda | | | | 47 | 47 |
| Arthropoda | 6 | | | | 6 |
| Fossil wood | 1 | | | | 1 |
| Lithological | | 70 | | | 70 |
| Totals | 126 | 202 | | 61 | 389 |

The Research Assistant registered the following specimens, many of which represent a backlog in the collections from former years:

| | | |
|---|---|---|
| Foraminifera | 1 | (rock specimen with numerous examples) |
| Spongiae | 25 | |
| Anthozoa | 175 | |
| Stromatoporoidea | 1 | |
| Vermes | 4 | |
| Cystoidea | 5 | |
| Crinoidea | 3 | |
| Bryozoa | 9 | |
| Brachiopoda | 148 | |

| | |
|---|---|
| Pelecypoda | 64 |
| Gastropoda | 269 |
| Cephalopoda | 53 |
| Trilobita | 17 |
| Branchiopoda | 10 |
| Arachnida | 1 |
| Total | 785 |

Last autumn the division sent a party into the James Bay Lowland area, the fourth since 1950. This year we reached our most northerly objective, Williams Island, in the Abitibi River. The island, 2,376 feet long by 616 feet wide, was surveyed, the geology recorded, and collections made of rocks and fossils. As a result of our four-year programme in the north a detailed knowledge of the stratigraphy and palaeontology of the Devonian of the area has been acquired. Our studies made possible a correlation with other parts of North America including southern Ontario, western New York, Michigan, and Indiana. It is of further significance to record that evidence has been afforded from our investigation of a barrier reef in Middle Devonian time in what is now the James Bay Lowland area.

Other research carried on includes:

(1) A study of the fauna of the Temiskaming outlier.

(2) An analysis of the Devonian Bryozoa in widely separated localities in Gaspé.

(3) Recognition and description of the oldest known coral, discovered in the Cambrian of Montana; to be published jointly with Professor B. F. Howell, Princeton.

(4) Description of the new stromatoporoid genus *Kionodictyon* and the genotype *K. granulosum.*

(5) A study of the Williams Island coral fauna.

Publications include:

(1) Lower and Middle Devonian of James Bay Lowland. Fritz and Cranswick. *Proceedings Geological Association of Canada,* vol. 6, pt. 1, 1953.

(2) *Rhopalonaria lambtonensis* n. sp., Fritz, *Journal of Palaeontology,* vol. 28, no. 1, January, 1954.

The Curator edited and produced Vol. 6, Pts. 1 and 2, of the *Proceedings of the Geological Association of Canada.* She also gave two undergraduate courses at University of Toronto; took part in examining committees for students in the Graduate School; and directed the studies of three postgraduate students.

Assistance was rendered to the following institutions: University of Buffalo; Geological Association of Canada; Geological Survey of Canada; Instituto Nacional para la investigacion de Recursos Minerales, Mexico; Magnolia Petroleum Company, Texas; McGill University; Union Producing Company, Texas; Indiana University; College of Wooster, Ohio; Toronto Transportation Commission; Princeton University; Quebec Bureau of Mines; Shell Oil Company, Calgary; American School of Classical Studies, Greece.

Our monthly exhibits included Cup Corals; Horseshoe Crabs; Sea Stars, fossil and recent; Scallops, past and present; and Sea-lilies.

At the annual meeting of the Geological Society of America held in Toronto in November, 1953, leading invertebrate palaeontologists from at least fifteen institutions (North American and European) visited the division to examine our collection of type specimens, as well as the research collection in general.

## DIVISION OF ENTOMOLOGY

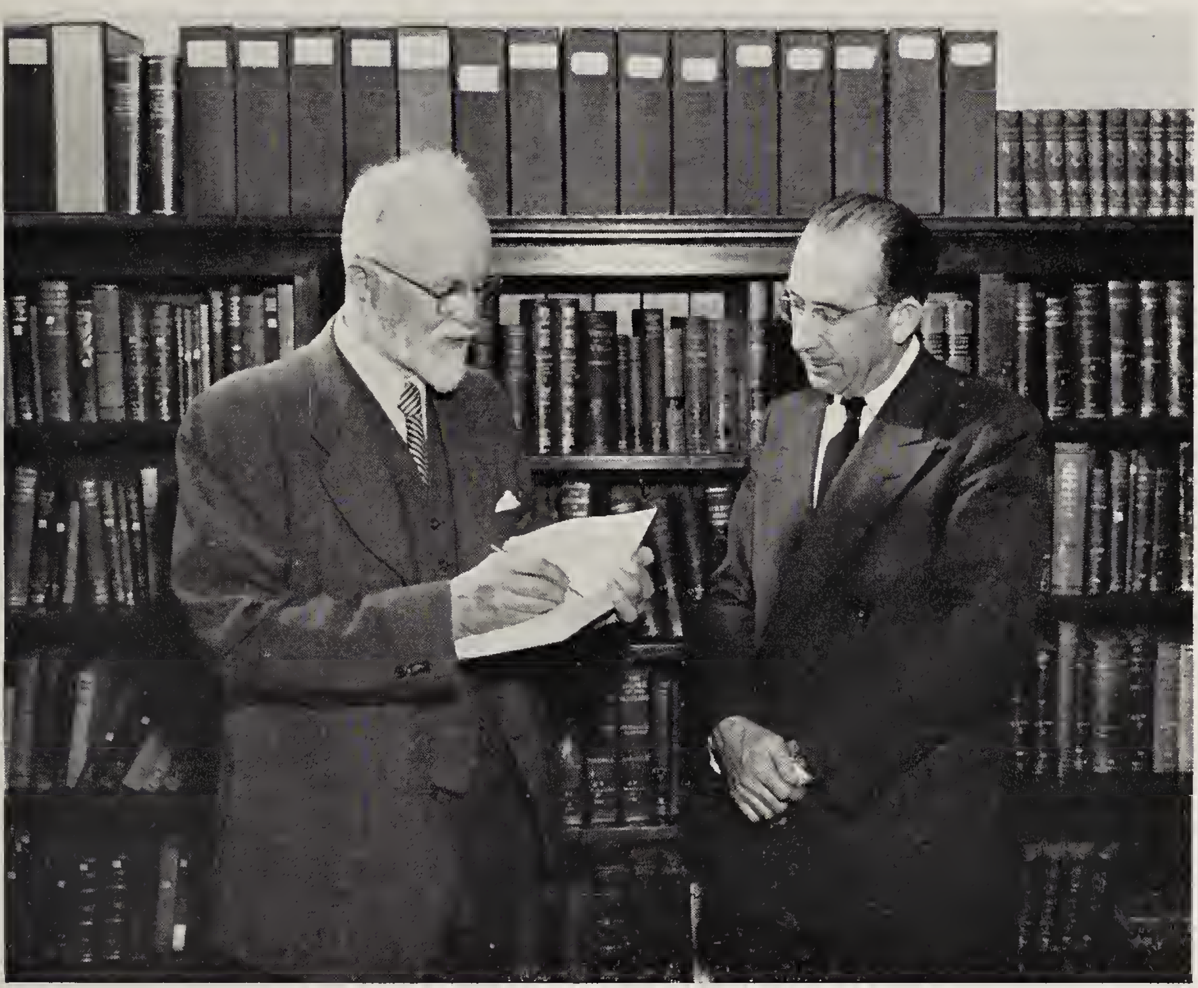
### By G. B. WIGGINS

The most important achievement was the publication of *The Odonata of Canada and Alaska*, vol. 1, by E. M. Walker, Honorary Curator of the division. This work is the product of Dr. Walker's more than fifty years' experience with Odonata in every province of Canada. Volume 1 is in two parts: Part I is a general introduction to the structure, life history and habits of the whole order, and Part II is a systematic study of the Zygoptera. Fifty-one species are recognized in the area treated and there are full descriptions and keys for the males and females. Descriptions and keys are given for most of the nymphs. The full range of each species is given, followed by a detailed description of the Canadian distribution. Based mainly on his own observations, but incorporating as well the work of others, the author has included an informative sketch of the habitat and life history of each species. Forty-three plates of figures, all the work of the author, are included along with one half-tone plate.

It is a fitting example of Dr. Walker's enthusiasm and endless interest in entomology, that, having finished one of his most valuable contributions to systematic zoology, he has immediately begun the work for Volume II on the Anisoptera.

The Curator continued with the manuscript for "The Orthoptera of Eastern Canada" with most effort devoted to the genus *Ceuthophilus*. Some time was spent during July, 1953, collecting material of this genus on Point Pelee and Pelee Island, Ontario, and 200 specimens were added to the collection. A paper dealing with the introduction of the termite (*Reticulitermes flavipes*) into Ontario was published. The Curator was elected to the Council of the Society of Systematic Zoology.

The Assistant Curator continued the study of Trichoptera and a considerable part of the year was devoted to the organization and continued expansion of the collection. Two thousand specimens were added during the past year. Most of the collecting was done in Durham County, Ontario, where several uncommon species were located. Material from these collections provided the basis for a study of the genus *Beraea* in North America and this is nearing completion. Rearing equipment was set up and progress was made in associating immature stages with adults for some limnephilids and phry-



Dr. E. M. Walker inscribing a copy of his new book for the Museum Director.

ganeids. A study of the limnephilid genus *Neophylax* in North America was begun. A reference file to the published data on North American Trichoptera was initiated.

Parts of the general collection have been made available to other workers as follows: *Vespula* to C. D. F. Miller (Canadian Department of Agriculture); *Oberea* to S. D. Hicks (Canadian Department of Agriculture); *Coenonympha* (records) to F. M. Brown (Colorado); *Tabanidae* (in part) to L. L. Bechuman (New York).

Other workers have helpfully provided material for the use of the division. We acknowledge, with thanks, the loan of material from the following: H. H. Ross and Mrs. L. K. Gloyd (Illinois Natural History Survey); J. G. Needham and M. J. Westfall (Cornell University); J. S. Rogers and T. H. Hubbell (Museum of Zoology, University of Michigan); D. J. Borror (Ohio State University); D. S. Rawson (University of Saskatchewan).

Valuable assistance has been given by the donation of specimens to the research collection. Appreciation is extended particularly to the following: B. Kooyman (Manitoba Department of Mines and Natural Resources) for

500 Trichoptera; J. B. Wallis (University of Manitoba) for 50 Trichoptera; Cornelius Betten (North Carolina) for material of beraeid Trichoptera. Grateful acknowledgment is also made to E. M. Walker, Honorary Curator of the division, for his valuable contribution of many books and periodicals to the library.

During the past year the Curator served on three graduate advisory committees and on eight examining committees. Under his direction a graduate student, W. Y. Watson, is preparing a doctoral thesis on the Coleoptera family, Coccinellidae. The systematic entomology portion of Zoology 25 was presented to students of Honour Biology. Twelve lectures to various organizations in southern Ontario on the research work carried on by this Museum were presented.

The identification of insects and other invertebrates continued to be part of the division's contribution to Museum public service. This service included the Ontario Department of Health, the Ontario Department of Lands and Forests, and many industrial firms and private persons Insect specimens and information for teaching purposes were made available to the Division of Education of the Museum.

Other projects completed during the past year included the reorganization of the divisional library, which greatly improved its usefulness for general reference purposes. New storage shelves for the boxes of papered specimens of the Odonata collection were added and work was begun on the transfer of the Odonata nymph collection to more permanent and efficient storage. New storage facilities were provided for the alcohol portion of the Trichoptera collection and additional space will be made available as the collection increases.

The collection of invertebrates other than insects is the responsibility of the division of Entomology and since no member of the staff is working with this collection, our main concern is that the material be kept in permanent storage and made readily accessible. A graduate student, P. Brunel, studying Crustacea in the University, was employed part-time in the division during the year to reorganize the Crustacea collection both for his own use and to make the material readily available to others.

# *The* ODONATA *of Canada and Alaska*

*By*

EDMUND M. WALKER
*Professor Emeritus of Zoology, University of Toronto*
*Honorary Curator of Zoology, Royal Ontario Museum of Zoology and Palaeontology*

## VOLUME ONE

PART I: GENERAL

PART II: THE ZYGOPTERA—DAMSELFLIES

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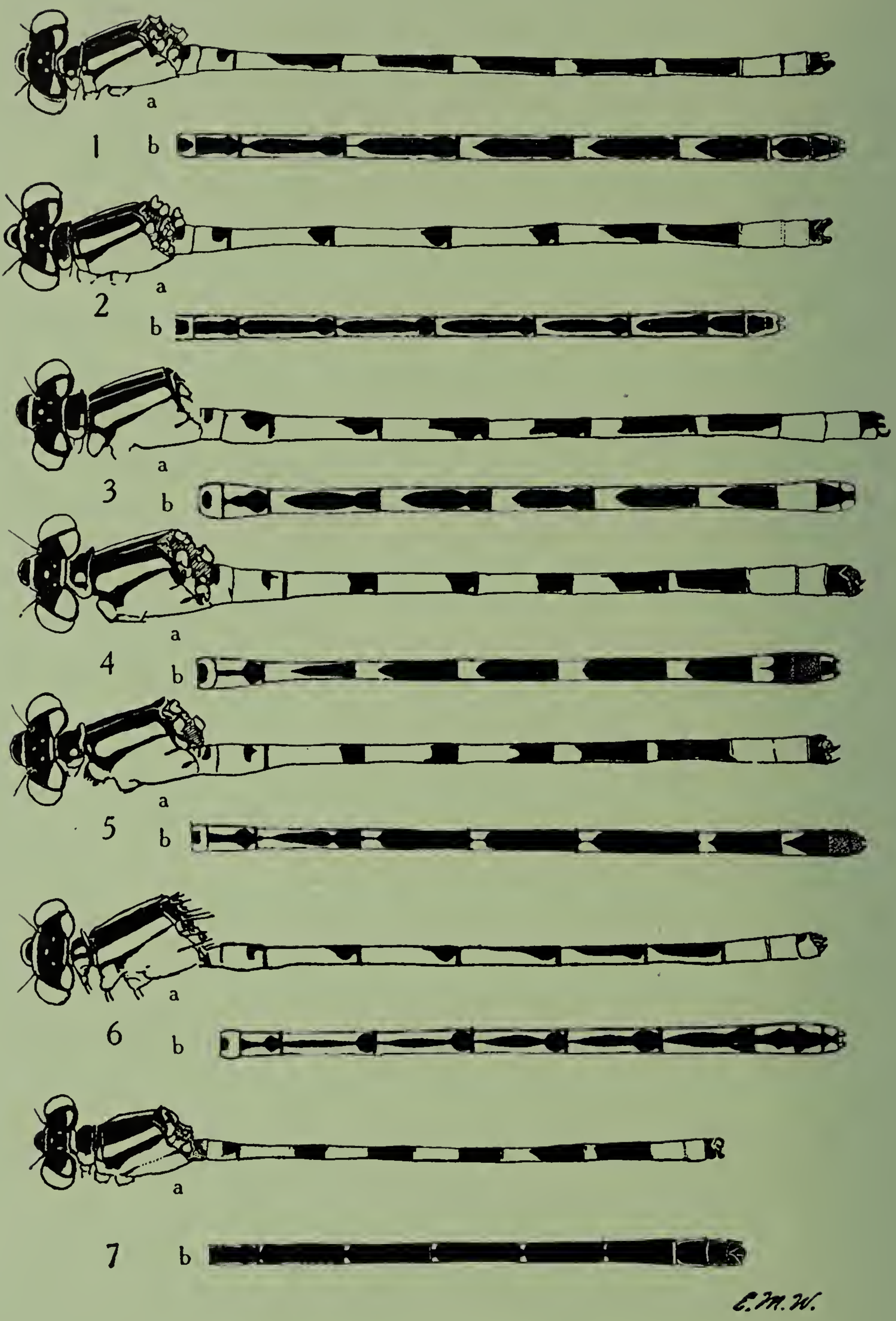
PLATE 17



SAMPLE PAGE

Medium to dark brown, paler beneath. Dorsum of head without distinct darker markings, except the eyes and the three black crescents of the developing ocelli; antenna with segs. 1 and 2 a little darker than the others. Thorax and wing-cases nearly uniform brown above, except the darkening of the longitudinal veins of the latter. Femora with inconspicuous darker streaks along the ridges and lines of setae, and an ante-apical dusky annulus; extreme apices of femora and tibiae somewhat darkened; tibiae otherwise nearly plain; tarsi pale, except seg. 3, which is mostly dark. Abdomen moderately dark above, deepening into a marginal stripe near the lateral carina; sterna pale with a usually conspicuous dark lateral stripe bordering the pleura, which in extended specimens appears as a light stripe between two dark ones. Caudal lamellae light to moderately dark brown, darkened along the axis and tracheae, the three dark bands usually indicated chiefly along the margins, one at the proximal fourth, another just beyond the middle, and a third at the distal fourth and around the apex.

Total length 27–28; h. w. 5.0–5.5; h. f. 4.5–5.0; caud. lam. 9.0–9.5; ov. 2.1–2.2; labium 3.8–4.5.

*Habitat and range.* Chiefly temporary or semi-permanent ponds in the open; prairie sloughs. N.S. to B.C., s. to N.J., Tenn., Mo., Okla., and Calif.

*Distribution in Canada. N.S.*—Colchester and Pictou counties; C.B. *N.B.*—Charlotte Co. *Que.*—Island of Orleans, Montreal, and Ottawa Co. *Ont.*—Essex, Kent, Lambton, Elgin, Oxford, Waterloo, Halton, Huron, Wellington, Peel, York, Northumberland, Bruce, Grey, Simcoe, Hastings, and Carlton counties; Muskoka, Parry Sound, Algoma, Thunder Bay, Kenora, and Rainy River districts. *Man.*—Winnipeg, Stony Mountain, Treesbank, Onah, Westbourne. *Sask.*—Regina, Bredin, Markinch, Moose Jaw, Swift Current, Maple Creek, Madison, Glidden, Snipe Lake, Burstall, Hamton, Lac Vert, Liberty, Saskatoon, Elbow, Prince Albert, and Waskesiu Lake (Prince Albert National Park). *Alta*—Red Deer. *B.C.*—Vancouver Is. (Sooke n. to Nanaimo Dist.), Hat Creek, Chilliwack, Cultus and Chaperon lakes, Osoyoos, Similkameen, Vaseau Lake, Penticton n. through the Okanagan Valley to Okanagan Landing and Armstrong, West Kootenay, Wasa, Premier Lake, and Canal Flats.

*Field notes. L. unguiculatus* is definitely more southern than any of the other transcontinental species. It is the most local *Lestes* in British Columbia, where it appears to be unknown anywhere north of about 50°30′N, but is by far the most abundant species in the Prairie Provinces, south of the wooded regions. Small prairie sloughs swarm with them, and they are equally abundant in the Eastern Provinces wherever there are small ponds in the open. Oxbow ponds in an open valley are a favourite type of habitat, even when they dry up soon after midsummer. Gravel-pit ponds or any kind of pond in the open appear to suit their needs. They are much less frequent in slow streams or spring-fed ponds, but they are not entirely absent from such habitats. We have not found them in shady situations such as those preferred by *L. rectangularis.*

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PLATE 17

Colour-pattern of *Enallagma*, (*a*) males, dorsolateral view, (*b*) abdomen of females, dorsal view: 1. *E. carunculatum*; 2. *E. civile*; 3. *E. clausum*; 4. *E. boreale*; 5. *E. cyathigerum*; 6. *E. vernale*; 7. *E. minusculum.* All figs. × 3.

SAMPLE PAGE

VERY FEW faunistic studies of a major group of insects have as yet been made for the whole of Canada or even a single province. Thus Dr. Walker, who has collected and studied Odonata for over fifty years in every province of Canada, makes a signal contribution in this book which gathers together all available information on the dragonflies of Canada and Alaska. His book meets the need too for more precise descriptions of the females of many of the species and of the nymphs of the majority of this suborder.

Dr. Walker deals first with the order as a whole and next with the Zygoptera. (A companion volume is in preparation on the Anisoptera.) The treatment is not confined to taxonomy and geographical distribution, but includes data on habitats, season of adult life, and brief notes on habits when these are available.

Students of the future interested in the study of Odonata will look upon Dr. Walker's work as the nucleus of this particular phase of entomology.

Edmund M. Walker is Professor Emeritus of Zoology at the University of Toronto and Honorary Curator of Entomology at the Royal Ontario Museum of Zoology and Palaeontology.

300 pages. 44 plates. 6 x 9 inches. $13.00

"It is a pleasure to recommend it highly to entomologists and zoologists generally, wherever they are located."—*Entomological News*, April 1954

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Please send me .......... copy(ies) of *The Odonata of Canada and Alaska*, by Edmund M. Walker, at $13.00 a copy.

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*Postage prepaid if remittance enclosed. Please include 15¢ exchange on out-of-town cheques.*

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## DIVISION OF ART AND EXHIBITS

### By T. M. SHORTT

During the past year considerable progress was made towards the completion of an exhibit dealing with Canadian Fishes, a cooperative project undertaken by the Museum and the Federal Government's Department of Fisheries. The alcove housing the exhibit has been enclosed by a partition, screening it off from the main gallery and the walls and ceiling have been painted a soft blue-green. All overhead lighting has been removed and the showcases are illuminated from within by cold cathode lighting units.

Completed and installed are two cases illustrating the external physical characteristics of fishes and the various methods of reproduction and develop-

Dr. W. B. Scott, Curator of the Museum's Division of Ichthyology, discusses details of cast of cisco with T. M. Shortt, Chief of Division of Art and Exhibits. This is one of the panels devoted to the descriptive series of Canadian Fishes.

ment; one case presenting a simple classification of living fishes for the layman; fifteen cases displaying casts of some 150 kinds of Canadian fishes, selected to show the range of various species and featuring all of the common and commercially or biologically important species; two temporary exhibit shadow boxes in which will be featured items of topical interest pertaining to fish or fisheries. The first two exhibits in these cases show "True Tiger" Muskellunge and Steelhead Trout. Also installed is an automatic slide projector for which series of Kodachrome slides are being prepared.

Two 20-foot mural paintings, prepared by the Fairbairn Studio of Ottawa, have been installed. In stylized, design form, these murals depict the aboriginal fishing methods of the North American Indian and Eskimo and the growth and development of the Canadian fishing industry.

Scale models of ten of the most important types of marine and freshwater fishing vessels have been constructed and will be installed during the coming year.

Also nearing completion are the four habitat groups which will illustrate certain marine and freshwater fishes in their natural environment.

Feature exhibits in the Aquarium-terrarium during the year have been Texas collared lizards and a bird spider from the south-west desert.

## ZOOLOGICAL LIBRARY

### By E. R. McCLURE

During the year 1,638 publications were received and catalogued, bringing the total holdings of the library to 60,785.

| | By exchange and donation | By purchase | Totals |
|---|---|---|---|
| Bound books | 17 | 26 | 43 |
| Unbound periodicals | 933 | 155 | 1,088 |
| Separates and reports | 487 | 20 | 507 |
| Totals | 1,437 | 201 | 1,638 |

In continuing the work of cataloguing the articles in the serial publications, author cards have been made up for the greater part of the material in the library. As a result of this work the divisional libraries possess a more comprehensive coverage of information contained in the library.

New exchanges were established with eight institutional libraries in North America and abroad. Samples of our Contribution series were sent for inclusion in the Permanent Exhibition of Foreign Scientific Literature at Zagreb University.

The conchological library of the Museum, which was housed in the former conchological division, was incorporated into the main zoological library.

The map collection was enlarged by the addition of a set of 1 inch to 1 mile topographic maps of Canada and a set of 8 inch to 1 mile aeronautical charts of Canada. The work of locating place names in connection with plotting the ranges of animals has been greatly facilitated by the use of these maps as well as the first two volumes of the new Gazetteer of Canada which were also obtained this year.

Through inter-library loan three publications were obtained for members of the staff, and several publications were lent to other libraries.

For the past few years the library has been operated as a reference library only. This was because borrowed books were kept out of the library for unnecessarily long periods, and also because many books were never returned. It was recently decided, however, that students would be permitted to borrow books for a period of ten days. It is hoped that those borrowing books will cooperate with the library, so that it will not be necessary to rescind this new ruling.

## PALAEONTOLOGICAL LIBRARY

### By E. N. HAMMELL

Seven hundred and fifty publications were received during the year 1953–54. The number of books, separates, and periodicals catalogued was 890, bringing our library total to 22,278. It should be pointed out that every scientific article which comes to this library, whether in separate form or one of many in a periodical, is catalogued for both subject and author.

| | By exchange and donation | By purchase | Total |
|---|---|---|---|
| Bound books | 8 | 15 | 23 |
| Unbound periodicals | 209 | 30 | 239 |
| Separates and reports | 488 | — | 488 |
| Totals | 705 | 45 | 750 |

As in other years, the Museum has received, in return for our publications, palaeontological and stratigraphical contributions from institutions and societies throughout the world including: The British Isles, Argentina, Australia, Austria, Belgium, Brazil, China, Finland, France, Germany, Holland, India, Japan, Mexico, New Zealand, Norway, Poland, South Africa, Sweden, and the United States of America. We are greatly indebted to our donors for these important additions to our library.

The Geological Survey of Canada lent to us rare publications on several occasions. McGill University and the Imperial Oil Limited were given literature upon request.

## LIST OF STAFF PUBLICATIONS

Baillie, J. L. Alcids, Gulls and Terns (Canadian Nature, vol. 15, no. 3, May-June, 1953, p. 100).

——— Chickadees, Swallows, Jays, Crows and Larks (Canadian Nature, vol. 15, no. 4, Sept.-Oct., 1953, p. 132).

——— Spring Migration April 1 to May 31, 1953—Ontario-Western New York Region (Audubon Field Notes, vol. 7, no. 4, Aug., 1953, pp. 270–2).

——— Nesting Season June 1 to August 15, 1953—Ontario-Western New York Region (Audubon Field Notes, vol. 7, no. 5, Oct., 1953, pp. 306–7).

——— Conservation Council Reports on Soil and Water (Federation of Ontario Naturalists Bulletin 62, Nov.-Dec., 1953, p. 15).

——— What about bounties? (Federation of Ontario Naturalists Bulletin 63, Jan., 1954, p. 28).

——— Fall Migration August 16 to November 30, 1953—Ontario-Western New York Region (Audubon Field Notes, vol. 8, no. 1, Feb., 1954, pp. 16–17).

Downing, S. C. The Wapiti (Canadian Nature, vol. 16, no. 1, 1954, pp. 24–25).

Fritz, M. A. *Rhopalonaria lambtonensis* n. sp. (Jour. of Palaeontology, vol. 28, no. 1, Jan., 1954).

Fritz, M. A. and J. M. Cranswick. Lower and Middle Devonian of James Bay Lowland (Proc. Geological Assn. of Canada, vol. 6, pt. 1, 1953).

Peterson, R. L. Studies of the food habits and the habitat of moose in Ontario (Contribution Royal Ontario Museum of Zoology and Palaeontology, no. 36, 1953, pp. 1–49).

——— Notes on the eastern distribution of *Eutamias minimus* (Contribution Royal Ontario Museum of Zoology and Palaeontology, no. 37, 1953, pp. 1–4).

Peterson, R. L. and J. K. Reynolds. Taxonomic status of the European hare in Ontario (Contribution Royal Ontario Museum of Zoology and Palaeontology, no. 38, pp. 1–7).

Scott, W. B. Freshwater fishes of Eastern Canada (Toronto: University of Toronto Press, 1954. pp. 133).

Snyder, L. L. An apparently hybrid Golden-eye (The Wilson Bulletin, vol. 65, no. 3, 1933, p. 199).

——— *Gavia adamsi* on Devon Island (Canadian Field-Naturalist, vol. 67, no. 4, Oct.-Dec., 1953, p. 181).

——— Summer birds of Western Ontario (Transactions Royal Canadian Institute, vol. 30, pt. 1, 1953, pp. 47–95).

——— On the distribution of *Colymbus grisegina holbolli* (Canadian Field-Naturalist) (*in press*).

——— Cassin's Kingbird in Canada (Auk, vol. 71, no. 2, April, 1954, p. 209).

Snyder, L. L. and E. D. Lapworth. A comparative study of adults of two Canadian races of Redwings (Canadian Field-Naturalist, vol. 67, no. 4, Oct.-Dec., 1953, pp. 143–147).

Urquhart, F. A. The introduction of the termite into Ontario (Canadian Entomologist, vol. 85, Aug., 1953, pp. 292–3).